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ABSTRACT

This paper summarizes and critiques the literature concerning the development and use of time-compressed, intensive course formats in colleges and universities and suggests directions for future inquiry. The paper begins with a discussion of the origins of intensive courses and their development over time. Briefly reviewed are related educational research on time and learning. Next, the paper focuses on studies of educational outcomes as they regard intensive courses. These studies are reviewed based on the type of intensive format investigated (summer, interim, modular, regular term, and weekend), the discipline studied, and the long-term learning effects. Also discussed is research that compares course requirements and practices between these formats. Additionally, literature is examined on student and faculty attitudes regarding different types of intensive formats. The paper concludes with a critique of the literature, some proposed research questions, and a discussion of intensive courses as they pertain to educational policy and practice. Contains 110 references. (GLR)

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March 4, 1991

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Traditional course formats have remained relatively intact in American higher education: most colleges and universities schedule the preponderance of their courses to meet several times per week over a period of twelve to sixteen weeks. Despite the fact that there has been little evidence to support their use over various alternatives, traditional course formats continue to dominate in higher education owing to long-standing collegiate and bureaucratic traditions (Hefferlin, 1972).

However, the last two decades have seen a rapidly growing interest in intensive courses--semester- or quarter-equivalent classes offered in time-compressed formats. Concerned with maintaining enrollments, colleges and universities are courting increasing numbers of adult and part-time students who often encounter serious time constraints upon returning to school (Bergquist, Gould, and Greenberg, 1981). In seeking to serve these students, many postsecondary institutions have introduced intensive courses aimed at minimizing time-related obstacles.

While intensive courses are increasingly common on college and university campuses, their presence often seems to generate varying degrees of disapproval among faculty and administrators. The conventional wisdom has long criticized intensive courses as being too compressed "to produce anything of educational value" (Slichter in Schoenfeld, 1967, p. 160). Moreover, intensive courses have been reproached for sacrificing breadth, disregarding academic standards to accommodate time constraints, and obliging students to "cram" information at the expense of genuine learning and development.

Nevertheless, given adult and part-time student demographic trends, intensive courses have--and will likely continue to--proliferate further. According to the National Center for Education Statistics (1989a), adult student enrollments increased 114 percent between 1970 and 1985 and now

constitute an estimated 41 percent of postsecondary enrollments. Meanwhile, part-time student enrollments rose nearly 87 percent during the same time period and part-time students now comprise approximately 42 percent of the enrollment in postsecondary education. Inasmuch as adult and part-time student enrollments are projected to increase further (NCES, 1989b), there is every reason to expect that our colleges and universities will continue to experiment with time-intensive course formats in the future.

In light of the growth of intensive course formats, there is a growing body of research which compares intensive and traditional courses. These investigations cut across a range of disciplines, fields of study, course formats, and degrees of intensiveness. Yet, there have been no major attempts to conceptualize and synthesize the scattered literature on intensive courses, much less serious efforts to critique the extant research and suggest avenues for future investigations. To address this lacuna, this paper marks an initial attempt to summarize and critique the literature as well as to suggest directions for future inquiry.

Procedure

This review of the literature was drawn from numerous sources. As a point of departure, we used the **Educational Research Information Clearinginghouse** (ERIC) to identify studies on intensive courses. We then conducted computerized searches in the **Social Science Index**, **Psychology Abstracts**, and **Dissertation Abstracts** data bases to locate additional articles and dissertations. References cited throughout these sources pointed to additional articles, chapters, and unpublished studies. We concentrated on studies conducted since 1965, but we identified a number of salient publications prior to that date. Altogether, we found roughly 100

publications that, in varying degrees, addressed intensive courses. After reviewing the collective literature, we identified four major lines of related inquiry: 1) time and learning studies; 2) studies of educational outcomes that compare various types of intensive courses with traditional formats; 3) studies comparing course requirements and practices between intensive and traditional formats; and 4) studies of student and faculty attitudes toward intensive courses.

We begin our discussion by tracing the origins of intensive courses and their development over time. We then briefly touch on related educational research on time and learning. Our review of intensive course research begins by focusing on studies of educational outcomes. These studies are reviewed based on the type of intensive format investigated (summer, interim, modular, regular term, and weekend), the discipline studied, and the long-term learning effects. We then briefly examine the research that compares course requirements and practices between the two formats. Following this discussion we examine the literature on student and faculty attitudes regarding different types of intensive formats. We conclude with a critique of the literature, some proposed research questions, and a discussion of intensive courses as they pertain to educational policy and practice.

History of Intensive Courses

Present day intensive courses evolved from several antecedents including summer sessions, interim sessions, modular calendar systems, foreign language training programs developed during World War II, and weekend colleges. Each of these educational innovations introduced a distinct form of intensive learning to college campuses and contributed to the variety of intensive course formats currently available.

Summer Sessions

Summer sessions were the earliest expression of concentrated study and were instrumental in legitimizing intensive courses in American higher education. Summer sessions emanated from several historical sources. Teacher institutes, which first appeared in 1839, were one of the earliest influences. Designed to upgrade elementary and secondary school teaching skills, these institutes later "evolved into summer normal schools" at many colleges and universities (Schoenfeld, 1967, p. 10). Other precipitating forces included the Chautauqua movement of the 1870s; mechanical and agricultural institutes, which were popular during the 1880s and 1890s; the rapid rise and expansion of graduate education; and the growth of university extension programs beginning in 1907 (Davis, 1972).

Harvard University was the first to offer short-term summer courses in 1869, courses which were initially noncredit, refresher classes for teachers (Schoenfeld, 1967). Johns Hopkins University (which utilized the summer months for the pursuit of scholarly research) and the University of Chicago (which introduced a four quarter system in 1892) also helped to pioneer summer sessions in the United States. Most public institutions did not incorporate summer terms until the late nineteenth century, but gradually colleges and universities adopted a summer session as a means to bolster enrollments and spread fixed-costs over the entire year (Gleason, 1986). Currently, the vast majority of all higher education institutions offer a summer term and most utilize intensive course designs.

Interim Sessions

A much more recent departure from the traditional semester and quarter terms is the interim session, which was one of the first calendar innovations

to have "lasting and broad impact" (Conrad, 1978, p. 183). Colleges and universities originally designed this three to four week term as an innovative alternative to concurrent scheduling where students could concentrate exclusively and intensively on a single subject. They developed out of a "dissatisfaction with [the] arbitrary temporal patterns" imposed by most colleges and universities and "represented an effort to temporally match the term structure" with varying educational objectives (Conrad, p. 182). Since their inception at Florida Presbyterian College (now Eckerd College) in 1961, interim sessions have proliferated and many postsecondary institutions now offer some type of interim term.

Modular Calendar Systems

The belief that intense, concentrated study enhances learning led some colleges and universities to adopt modular calendars which, in effect, established interim-like sessions throughout the academic year. Scio College in Ohio was the first college to adopt a modular calendar when it introduced its "One-Study Plan" following the Civil War. Scio's Plan required students to explore one subject until they "mastered" the content (Powell, 1976). In 1877, Williamston Female College in South Carolina introduced an intensive calendar system which divided the school year into seven terms and students studied one subject each session. Williamston followed this plan for more than 30 years and claimed it significantly increased students' attention and retention of material (Powell, 1976).

The first college in the twentieth century to adopt a modular-type calendar was Hiram College in Ohio. The Hiram Study Plan divided the academic year into four quarters of nine weeks each, and students' studied one intensive course each term along with a "running course" that continued

throughout the entire year (Eckleberry, 1958). Despite strong student support for the plan, Hiram College reverted to a more traditional calendar in 1958 due to faculty and administrative discontent (Powell, 1976). Although Hiram College eventually dropped its modular plan, a number of other colleges introduced modular calendar systems in the last several decades. Three of the most notable examples are Colorado College in Colorado, Martin College in Tennessee, and Mount Vernon College in Washington, D.C.

Language Acquisition Programs

Another significant development in the evolution of intensive courses was the foreign language training programs developed by the United States and British Armies during World War II to rapidly train interpreters. These programs were considered highly successful; indeed, the United States Army's Special Training Program (ASTP) reportedly could train fluent interpreters within months (Powell, 1976). The success of these concentrated language programs suggested that intensive study could be a powerful alternative to traditional learning formats and, following the war, many college faculty who had participated in these programs introduced intensive coursework into colleges and universities (Powell, 1976).

Weekend Colleges

In the mid-1960s, still another intensive format emerged--the weekend college--which catered to working adults as well as other students who were unable to pursue degrees during the regular week. Miami-Dade Junior College offered the first such program beginning in 1965, but weekend colleges did not proliferate until the 1970s (East, 1988). Recent surveys indicate that weekend colleges are currently experiencing rapid growth. According to a 1986 survey of both two-year and four-year institutions, there are approximately

225 weekend colleges nationwide and 55 of these programs emerged in 1985 or 1986 (East in Watkins, 1989). As a result of their proliferation, thousands of adults, the majority between the ages of 25 and 50, have enrolled in weekend colleges as a means of attaining an undergraduate degree (Watkins, 1989).

Time and Learning

Educational researchers have long been interested in the concept of time and learning. There are four areas of time-related inquiry and research which warrant scrutiny in relation to intensive learning: massed versus spaced learning, concentrated study, interference theory, and allocated time and learning. A brief synopsis of each provides a useful informing context that can help to frame our critique and inform future research.

Massed Versus Spaced Learning

Massed versus spaced learning research dates back to the classical learning experiments of Ebbinghaus's (1964) in the late nineteenth century, in which he found that spaced practice was clearly superior to massed practice with regard to learning nonsense syllables. Ebbinghaus's findings have been replicated in dozens of studies under a myriad of conditions. According to Dempster and Farris (1990), one of the "most dependable and robust phenomena in experimental psychology" is the spacing effect (p. 97).

In study after study, researchers have found that distributing information over several spaced presentations is far superior to learning material in a single "massed" session. In summarizing the literature, Dempster and Farris (1990) conclude: "two spaced presentation are about twice as effective as two massed presentations, and the difference between them increases as the frequency of repetitions increases" (p. 97). Many theories

have been offered to explain this phenomena. Anderson (1990), for example, contends that spaced learning promotes variable encoding in memory. In this instance, encoding refers to the conversion of information into a form of code which is then stored in memory. Variable encoding increases the avenues of access to stored information which in turn, increases the opportunity for retrieval from memory at a later date.

Austin's (1921) study is representative of the spacing effect research that has investigated massed versus spaced practice of "meaningful" material. Austin required one group of students to read a total of sixty history and economic selections five times during one intensive session, whereas a second group read the same selections once a day for five consecutive days. She found that the "massed" group recalled 66 percent of the material immediately following the experiment compared to 64 percent in the "spaced" group. One month later, however, the amount recalled dropped to 11 percent and 3 percent for the "massed" and "spaced" groups respectively.

In the same vein, Bahrick's and Phelps's (1987) study found that the differential affects of massed and spaced practice are long-lasting. Bahrick and Phelps tested subjects' retention of English-Spanish word pairs they learned 8 years earlier under spaced (30-day intervals) and massed learning (single-day) conditions. Their findings revealed that the subjects who learned under spaced conditions recalled twice as much as the "massed" group.

It is tempting to hypothesize from this research that traditional-length courses are likely to yield superior long-term learning outcomes over intensive courses. However, as Hefferlin (1972) noted, intensive courses do not reflect massed practice as defined in many of these experiments. In his words:

> "Instead, they actually illustrate distributed [i.e. spaced] practice since they employ daily cycles of rest and effort comparable to the 24-hour cycle sometimes used in the distributed practice experiments" (Hefferlin, 1972, p. 94).

Thus, it remains unclear as to how the massed and spaced research relates to intensive courses. However, this research indicates that this relationship is an important area for further study.

Concentrated Study

Walberg's (1988a, 1988b) and Csikszentmihalyi's (1982) research on creativity and subjective experiences suggests that intensive periods of concentrated study may benefit students in ways not yet understood. Walberg (1988b), whose research has explored the origins and nature of creativity, notes that:

> "psychological studies of the lives of eminent painters, writers, musicians, philosophers, religious leaders, and scientists of previous centuries, as well as prizewinning adolescents in this country today, reveal early, intense concentration on previous work in their fields, often to the near exclusion of other activities" (p. 76).

Similarly, Csikszentmihalyi's (1982) research suggests that "deep concentration," "immersion" in an activity, and "undivided intentionality" lead to intrinsically rewarding "optimal experiences" which nourish and strengthen the self (p. 22). Csikszentmihalyi comments:

> Optimal experience stands out against this background of humdrum everyday life by excluding the noise that interferes with it in normal existence. Thus the first characteristic mentioned by

> people who describe how they feel at the height of enjoyment is a *merging of action and awareness*; a concentration that temporarily excludes irrelevant thoughts, feelings from consciousness. This means that stimuli outside the activity at hand have no access to consciousness; past and future cease to exist subjectively. This continuous focus on the present produces *a distortion of time* perspective. Minutes seem to stretch for hours, or hours elapse in minutes: Clock time is replaced by experiential sequences structured according to the demands of the activity (p. 22).

According to Csikszentmihalyi, optimal experiences result in a "loss of self consciousness" which yields true enjoyment and satisfaction (p. 22). Moreover, once felt, optimal experiences are self perpetuating since high levels of satisfaction motivate the individual to seek out additional experiences of a similar nature.

To be sure, research in these areas is still in its infancy, and the question remains as to whether all students can benefit from intense concentrated study. These investigations suggest, nonetheless, that concentrated study may cultivate skills and understandings which might remain untapped and undeveloped under the traditional concurrent course scheduling system.

Interference

Interference theory guided a number of studies in the 1950s and 1960s, and was investigated under a wide variety of conditions and situations. In brief, interference theory predicts that similar tasks that precede or follow a learning activity will "interfere" with an individual's long-term retention of the learned material. For example, Underwood (1957) found that the more

lists (such as nonsense syllables and geometric forms) subjects learned, the less they recalled, which Underwood attributed to "proactive interference"--interference from previously learned material (p. 53). Researchers speculate that interference weakens encoding which, in turn, diminishes an individual's ability to retrieve stored information from memory at a later time.

With regard to education, some have speculated (Boddy, 1985; Hefferlin, 1972) that interference may diminish learning under concurrent scheduling conditions where students must divide their attention between four to five courses each semester. According to Hefferlin (1972), concurrent schedules distract students and promote fragmented learning while, in contrast, intensive schedules foster uninterrupted and concentrated learning.

In one of the few studies to apply interference theory to intensive scheduling, Boddy (1985) studied students' performance in four intensive summer courses and four matched semester-length classes. He predicted an inverse relationship between course load and achievement and hypothesized that larger course loads would encumber learning because of increased levels of "interference." However, Boddy found no relationship between course load and achievement. Thus, the connection between interference theory and course scheduling remains unclear.

Allocated Time and Learning

Finally, many researchers have studied the quantity of time needed to learn. Most educators seem to believe that more time equals more learning and, in fact, this argument has been advanced in support of the semester versus the quarter calendar system. However, research indicates that the relationship between time and learning is less clear-cut. For example, Karweit's (1984) review of the time and learning literature concluded that

"time is a necessary, but not sufficient, condition for learning" (p. 33). Walberg's (1988b) review concurred, and further emphasized that time in and of itself is only a "modest" predictor of achievement--and that other factors including "student aptitude," "quality of instruction," the amount of "productive classroom time," and the classroom and home environments are equally important to achievement (p. 126). In addition to these factors, Gettinger (1984) argued that educators must also consider the "time needed to learn" which, she contends, is another important learning ingredient since students' learning rates differ depending on the task and learner characteristics (p. 15). In short, these studies suggest that while the quantity of time spent is not an unimportant factor, many other factors may be equally or more important in predicting student achievement. They also suggest that allocating fixed amounts of time to learning--without considering the factors listed above--diminishes every student's learning potential.

Research on Intensive Courses

There is large body of writing and a substantial number of studies that have compared various intensive and traditional course formats in higher education. The literature includes case studies as well as research using experimental, quasi-experimental, and cross-sectional survey designs. The emphasis, however, has clearly been on non-experimental and quasi-experimental research.

Our review of these studies is divided into six sections. The first section concerns studies that have measured short-term intensive learning outcomes in terms of five intensive course formats. [The reader is directed to Appendix A, which summarizes this research in tabular form.] Next, these same studies are re-examined by discipline to compare outcomes across

disciplines and fields of study. The third section briefly explores the few studies that have examined the long-term effects of intensive courses. The fourth section summarizes research comparing course requirements and practices between intensive and traditional formats, and the last two sections look at the literature on student and faculty attitudes concerning intensive courses.

Outcomes By Type of Intensive Course

This section reviews the research on the educational outcomes of intensive courses. The research is organized into five types of intensive formats: summer, interim, modular, regular term, and weekend formats. Three representative studies will be discussed under each format including a case study and two experimental investigations.

Summer

Summer courses typically last from three to eight weeks and find expression in a variety of intensive designs ranging from total immersion to semi-intensive formats in which students concurrently enroll in two or three classes. In the last several decades, there have been a number of experimental studies investigating intensive summer courses. Most of these studies have found no statistical differences between intensive and traditional course formats (Austin, Fennell, and Yeager, 1988; Bester, 1965; Kanun, Ziebarth, and Abrahams, 1963; and Murphy, 1979) but three have found modest differences in favor of intensive learning (Boddy, 1985; Gaston, 1974; and Gleason, 1986). In addition to the experimental research, a number of case studies have found in favor of intensive summer courses (Deveny and Bookout, 1976; Eller, 1983; Keilstrup, 1981; Parlett and King, 1971; Solecki, 1971; Stephens, 1978; Troiani, 1986). The following three studies are representative of the intensive summer course research.

Kanun et al. (1963) were among the first to investigate intensive course formats in higher education. Kanun et al. compared the test scores of three sections of a psychology class after controlling for instructor, lectures, textbooks, and examinations. The only difference between the classes was that two of the sections were taught during a ten-week quarter (28 hours of instructional time) and the third during a five-week summer session (24 hours of instructional time). They found no significant differences in achievement between the three groups, findings which replicated the results of a pilot study that they had conducted one year earlier. Kanun et al. concluded that the spacing effect had little impact on outcomes as it relates to summer and traditional-length classes and called for continued research to identify the optimal factors in learning.

Gleason (1986) compared student achievement between three sections of a summer macroeconomics course taught in either a 3- or 5-week format and four sections of the same course taught during the regular semester. She administered the nationally normed Revised Test of Understanding in College Economics (TUCE) as a pre-test measure of aptitude and post-test measure of achievement. Gleason found that students in the 3-week macroeconomics course scored significantly higher on the post-test than the 15-week class, although she noted that the groups were not statistically equivalent. She found no outcome differences between the 5- and 15-week courses. Gleason concluded that the calendar period has no impact on achievement in economics and that "intensive [summer] courses are at least as effective as semester-length courses taken concurrently with other subjects" (p. 98).

Foreign languages have been studied vis-a-vis intensive instruction more than any other discipline, and most investigations have found intensive

courses to be effective alternatives to traditional course formats. For example, Eller (1983) described a sixteen credit summer Spanish course offered at the University of Nebraska-Omaha. The class met six hours a day, five days a week, for eight-weeks and incorporated a total of 240 hours of instruction--the equivalent of two years of Spanish instruction taken under the traditional format. According to Eller, the summer students' test scores were equal if not better than those earned in regular courses, attrition rates were lower, and summer students exhibited greater conversational skills at the end of the course "probably because the students had been given the opportunity to concentrate fully on the subject" (p. 226). Eller noted that intensive courses were more demanding of instructors due to the constant need for planning, but concluded that the intensive Spanish summer courses were highly successful options to traditional course formats.

Interim

Interim courses are unique in that they often exhibit an quasi-immersion design where students are intensively involved in one course for roughly three to four weeks. Our review found three experimental studies which compared intensive interim courses with semester or quarter-length classes. Two of these studies found no differences in outcomes between these two formats (Masat, 1982; Studdard, 1975), whereas one reported mixed results (Richey, Sinks, and Chase, 1965). There have also been several case studies describing intensive interim courses, all of which positively recommended intensive formats (DuVerlie, 1973; Tyler, 1970; Wallace, 1972). The following studies are representative of the research in this area.

Richey et al. (1965) were among the first to investigate student achievement in the intersession. Richey and his colleagues compared the final

course grades of students in eleven matched courses, one-half of which were offered during the 17-week spring semester and one-half during the 13-day intersession. The courses were matched based on the course number, instructor, and content. The analysis revealed nonsignificant differences in seven of the eleven pairs of courses and significant outcomes in the remaining four. Of the four matched courses with significant outcomes, the results favored intersession courses by a three to one margin.

Richey and his colleagues then compared intersession and semester student achievement after grouping students according to class standing, grade point average, gender, age, and college enrollment. Altogether, the researchers studied 18 separate groups of students registered for either intersession or semester classes. Their analysis revealed that several intersession groups earned significantly higher grades than the comparable groups enrolled in the semester classes. These groups included junior and senior students, undergraduate students (regardless of grade point average), male and female students, students aged 22 and younger, and students registered for arts and sciences and business courses. Conversely, two groups of semester students--those registered for education classes and graduate students with a grade point average of 3.0 or less--outperformed the same groups enrolled in intersession classes. In summary, of the 18 groups studied, six groups exhibited nonsignificant achievement differences in intersession versus semester courses. Of the remaining twelve groups, ten earned significantly higher grades in intersession courses, and two obtained higher grades in semester classes.

Richey et al. concluded that student performance in the intersession equaled that of the semester term and suggested that "consideration . . . be

given to the possibilities of expanding course offerings in the Intersession so that the needs of a greater number of students be met" (p. 41). However, they also admonished that intersession courses "should be taught by enthusiastic, experienced and competent instructors, who are able to adapt themselves to the concentrated nature of Intersession, and who have positive feelings toward teaching in a short term" (p. 41-42).

Masat (1982) examined a computer science "immersion" course that was offered during the twelve-day interim term at Glassboro State College. The class met four days per week for three weeks throughout the entire day. Masat compared the interim students' final grades with those from a matched semester-length and 6-week summer course which received the same content, homework, and examinations. He found that the intersession class "compared favorably" to the other formats and that the "intensive" students' mean course grade was slightly higher than that earned in either the matched semester or summer courses (p. 328). Moreover, he noted closer relationships among class members and increased student productivity, which he attributed to fewer interruptions and greater "inherent cohesiveness" in the intensive class (p. 328). Masat concluded that "students [in the intersession course] learned as well or better than in either a semester or summer session course" and that "three weeks can be used to teach an introductory computer science course efficiently and effectively without any loss in academic integrity" (p. 328).

Finally, Wallace (1972) examined seven intensive courses in French, German, Russian, and Spanish offered at The School for International Training during a January interim session. These courses were offered to both beginning and intermediate-level students. The classes met six hours a day, six days a week, for three weeks; the nationally normed MLA Cooperative

Foreign Language Test was given as a post-test measure of achievement. Wallace found that the beginning foreign language students scored above the fiftieth percentile for one year college general norms in three of the four areas tested. Moreover, students with only one year of previous language instruction scored just below the two and one-half year norms. He concluded that three weeks of intensive language instruction could yield equal if not superior learning outcomes to a thirty week class offered in a traditional semester-length format.

Modular

Modular systems represent a unique learning environment in that intensive courses are the norm, not the exception. Typically, the academic year is divided into five to ten modules and students concentrate intensively on one or two courses each term. Of the studies reviewed comparing modular and traditional schedules, three found no significant differences in outcomes, (Blackburn, Armstrong, and Dykes, 1977; Haney, 1985; Waechter, 1966) and two reported superior results in favor of modular scheduling (Kuhns, 1974; Mazanec, 1972). The literature review also revealed one case study which endorsed intensive courses (Richardson, 1973). Three representative studies of modular formats are discussed below.

In 1975, the University of Wisconsin-Oshkosh instituted a modular-like schedule which divided the fall and spring semesters into two 7-week and one 3-week term, and the summer session into two 4-week terms. As a result of the new system, courses during the regular academic year were scheduled for either 3, 7, or 14 weeks. To determine whether the educational outcomes in intensive courses were equal to those in semester-length classes, an evaluation team compared course grades between 3-, 7-, and 14-week matched classes. According

to their analysis, none of the course formats exerted a "differential impact on either student learning or student assessment of instruction" (Blackburn et al., 1977, p. 40). However, the evaluation team noted that 3-week courses produced slightly higher course grades than either the 14-week or 7-week courses, and 7-week classes yielded higher course averages than 14-week courses (p. 26). Moreover, students earned higher grades in courses offered in the first 7 weeks, than in the same course scheduled in the second 7 weeks of the semester (p. 26). Finally, the evaluation team also noted that 14-week classes had greater percentages of incompletes and withdrawals than either the 7- or 3-week classes.

Mazanec's (1972) study also investigated modular and concurrent scheduling formats. He randomly assigned 75 students to one of two formats--an intensive or a semi-intensive schedule. The "intensive" group took four consecutive courses (speech, algebra, English, and political Science) during the semester and each class met three hours a day for three weeks. The "semi-intensive" group took the same four courses, but two at a time, and each class met seven hours per week for just over six weeks. A control group studied the same four subjects, but the classes were scheduled concurrently over the entire semester. The same instructors taught each of the corresponding classes in each of the three formats.

Mazanec then compared pre- to post-test scores and final course grades in the intensive, semi-intensive, and semester-length classes. He found nonsignificant outcomes in three of his analyses but significant findings in favor of intensive courses in all remaining analyses. The following table summarizes Mazanec's findings based on course and outcome measures.

See Table 1 on page 77

Mazanec concluded that "it appears that certain courses are indeed taught in a more effective manner under the intensified and semi-intensified system of instruction than under the conventional semester system" (p. 144).

Richardson (1973) described an intensive German course offered at Colorado College, which adopted a modular calendar system in 1970. Under the modular system, the academic year was divided into nine 3 1/2 week blocks and consequently, the two semester sequence of German required under the old semester calendar was modified into an eight-week, two block sequence. The resultant German course incorporated 14-16 contact hours per week, which Richardson likened to the U.S. Army language training methods. According to Richardson, the modular system allowed instructors to re-create the German culture within the classroom, promoted experimentation and diversification of teaching methods, and freed instructors from the "tyranny of the bell" which prompted greater numbers of continuing, in-depth class discussions (p. 192). This system also freed students from competing demands from other courses and allowed them to concentrate exclusively on German. However, Richardson inferred that students' retention of intensively learned material was inferior to that learned in longer, less concentrated courses and recommended "maintenance courses" to insure long-term retention (p. 193).

Regular Term

Intensive courses offered during the regular semester or quarter represent another interesting variation, since these courses are often taken concurrently with traditional-length classes. A number of researchers have

studied intensive courses offered during the regular semester. With only one exception, the experimental research reviewed in this tradition has found no significant differences in learning outcomes between compressed courses and quarter- or semester-length classes (Allen, 1974; Austin et al., 1988; Brackenbury, 1978; Doyle and Sanders as reported in Doyle, 1978; Kirby-Smith, 1987; Knowles, 1972). However, one study reported significant outcomes in favor of intensive courses (Ray and Kirkpatrick, 1983). The literature search also found one case study which also positively recommended intensive courses (Frank, 1973). The following three studies are representative of the research in this tradition.

Knowles (1972) used five different measures of achievement to compare 18 students enrolled in a semester-length research methods course in public administration, with 15 students enrolled in the same course which met seven hours a day for a total of seven days. Course content and class requirements were the same for each class. Knowles found no statistical differences between the two groups on any of his outcome measures (which included grades on quizzes, a term project, a critique of an article, a "mini-study," and the final course grade), and recommended that intensive formats "become a permanent part of a graduate school curriculum" provided that research continues to yield similar results (p. 114).

Ray's and Kirkpatrick's (1983) study assessed the impact of different time formats on both learning and attitudinal change. They measured students' anxiety, knowledge, and attitudes regarding human sexuality after taking either a 3-week or 15-week human sexuality course held during the regular semester. The 3-week class met for 3 hours a day, 5 days a week whereas the semester-length course met 3 hours each week for 15 weeks; both courses had

the same instructors. Ray and Kirkpatrick administered the Sex Knowledge and Attitude Test (SKAT) and the State-Trait Anxiety Inventory (STAI) as pre- and post-tests to measure students sexually-related anxiety, sexual knowledge, and sexual attitudes. They found that both groups exhibited significant decreases in anxiety, greater tolerance for a variety of sexual behaviors, and increases in sexual knowledge. But, the students in the intensive course exhibited significantly higher pre- to post-test gain scores in sexual knowledge than students in the semester-length class. Ray and Kirkpatrick concluded that "the duration of the course is less important than the method of teaching it" (p. 84).

Finally, Frank (1973) reported on an intensive course in German which concentrated four, semester-length German courses into one intensive course. The course met twenty hours per week for the entire semester and students earned fourteen hours of credit. According to Frank, students found the course to be highly rewarding but difficult compared to their other university courses. Despite its difficulty, students in the intensive course consistently scored higher on comprehensive examinations and found the intensive course more stimulating than traditional-length German courses. As a result of its success, a higher proportion of students enrolled in upper-division German courses and the other foreign language disciplines within the department inaugurated their own intensive foreign language courses.

Weekend

In many respects, weekend programs exhibit the most concentrated form of intensive learning. At the one extreme, courses can be compressed into two weekends and still amass up to 40 hours of classroom time. This has led to widespread concerns that achievement levels between weekend and traditional

formats are not comparable.

A number of investigators have researched intensive weekend courses. Without exception, experimental studies comparing weekend and traditional-length courses have found no significant differences in learning outcomes between compressed and traditional formats (Austin et al., 1988; Brackenbury, 1978; Doyle, 1978; Doyle, Moursi, and Wood, 1980; Doyle and Yantis, 1977; Shapiro, 1988). Of the three case studies reviewed, all reported positive outcomes and endorsed intensive formats (Berk, 1979 and Lasker, Donnelly, and Weathersby, 1975; Pflanzer and East, 1984). The following experimental and case studies exemplify the research in this tradition.

Brackenbury (1978) compared final examination grades in eight sections of a philosophy of education class. All sections had the same instructor, course requirements, textbook, and final examination. The duration of the classes was the only difference. There were three 15-week sections, two 8-week sections, and three weekend classes which met over the course of four consecutive weekends. Brackenbury reasoned that philosophy required "lengthy exposure" to "internalize [its] perspectives" and predicted that students in the semester-length sections would outperform those in the intensive sections (p. 93). Instead, he found no significant association between final exam grades and course format and concluded that varying course formats did not significantly impact on learning.

Doyle, Moursi, and Wood (1980) randomly assigned thirty-nine students enrolled in a graduate class in business administration to one of two groups. The control group met two hours a week for sixteen weeks, whereas the intensive group completed the class over the course of two weekends. Otherwise, the instructor, the total amount of classroom time, the content,

and the instructional methods were identical. Doyle and his colleagues compared students' course grades and scores on a cognitive achievement test which was designed to measure knowledge and understanding of administrative concepts. They found nonsignificant differences between the two groups on both outcome measures but the intensive group's mean course grade was slightly higher than the traditional group's, who in turn, scored higher on the cognitive achievement test. Doyle et al. concluded that "students in this format apparently learn as much as well as students in traditional formats and do not seem to be unduly exerted in doing so" (p. 14). Furthermore, they recommended that intensive courses remain in the curriculum.

Berk (1979) described an intensive statistics class offered at the University of Southern California in which students met for eight hours each day for eight consecutive Saturdays. One month prior to the beginning of the class, students received the textbook and course outline along with reading assignments to be completed by the first class session. Once the class began, each eight hour session consisted of lectures which lasted from forty-five minutes to one and a half hours, alternated with problem solving sessions where students worked on problem-sets either independently or in small groups. According to Berk, the statistics course

> "received consistently high ratings by students and positive comments by faculty members who teach courses for which statistics is a prerequisite. Its structure and applied orientation, in fact, have been instrumental in attracting students from sociology, political science, and criminology programs at other area universities" (p. 88).

In summary, the short-term outcome studies comparing intensive and

traditional course designs seem to suggest that intensive courses are effective alternatives to traditional course formats. If one accepts course grades, final examination scores, or pre- and post-tests as solid measures of achievement, then there is modest--but consistent evidence--that intensive courses yield equivalent, and sometimes superior, outcomes compared to traditional formats. The case studies also point to the relative effectiveness of intensive course designs. Without exception, these studies report that students benefit from the concentrated, unfragmented, and uninterrupted learning intrinsic to intensive classes and most report that "intensive" students perform as well or outperform those in matched traditional-length classes.

When these findings are broken down further, the research suggests that intensive courses also yield equal if not superior outcomes regardless of their format. As shown in Appendix A, which categorizes all the studies according to format, the preponderance of nonsignificant outcome studies under each format suggests that there are relatively minor differences in student achievement based on type of format.

Finally, when these findings are examined across various levels of intensity (e.g., 2 weekends, eight weeks), the research shows no substantial differences in outcomes. Of the ten studies which compared different degrees of intensity, seven reported nonsignificant differences in outcomes (Austin et al., 1988; Blackburn et al., 1977; Brackenbury, 1978; Doyle and Sanders in Doyle, 1978; Kanun et al., 1963; Masat, 1982; and Shapiro, 1988). Of the remaining three studies, one reported findings in favor of the most intensive format studied (Gleason, 1986), one in favor of the least intensive format studied (Boddy, 1985), and the last reported mixed results which varied

according to the subject matter (Mazanec, 1972).

However, it is important to note that the methodological and measurement limitations associated with most of these studies, discussed at length in a later section, suggest that it is premature to draw any definitive conclusions. We turn now to a discussion of the outcomes research organized by discipline and field of study.

Outcomes by Discipline

As the preceding section illustrates, studies of intensive courses have been conducted in a range of disciplines and fields of study. Inasmuch as many in higher education hold the belief that the relative effectiveness of intensive learning varies by field of study, we briefly examine this question. Table 2 provides a summary of major studies organized by discipline and study design (experimental or case study). The experimental research is further grouped according to whether the findings were nonsignificant or significant in favor of intensive (+ intensive) or traditional (+ traditional) courses.

See Table 2 on pp. 78-79

Table 2 shows (with only one exception) that regardless of discipline, the research finds either no differences between intensive and traditional-length classes or superior outcomes in favor of intensive courses. Of the 33 disciplines or subdisciplines reported in Table 2, the findings are as follows: thirteen exhibited no significant differences between intensive and traditional formats; five disciplines had significant findings in favor of intensive learning; and six disciplines exhibited mixed results. All the case studies, which encompassed ten different disciplines/subdisciplines, reported

positive outcomes in favor of intensive formats.

Table 3 compares results across major fields of study--humanities, social sciences, sciences, and the professions--when the disciplines are grouped according to major field.

See Table 3 on page 80

Table 3 shows that the social sciences exhibited the largest proportion of significant findings, followed by the humanities. Only one of the studies in the sciences and two of the studies in the professions showed significant outcomes. All significant outcomes in the humanities, sciences, and social sciences favored intensive courses whereas one of the significant studies listed under the professions favored traditional-length courses, and the other favored intensive classes.

It seems remarkable that of all the higher education studies reviewed, only one found intensive courses inferior to traditional-length classes (Richey et al., 1965). This study, which was discussed earlier, compared the final course grades between eleven matched courses--one-half of which were semester-length classes and one-half, 13-day intersession courses. The findings revealed that of the eleven pairs of courses studied, only one semester-length course--a graduate class in education--yielded superior outcomes compared to its equivalent in the intersession. All other courses exhibited either nonsignificant or significant outcomes in favor of intensive learning.

In addition to Richey's et al. study, however, the literature review located one other investigation which found outcomes in favor of longer

classes. (Since it studied a noncollege population, it was not included in Appendix A or Tables 2 and 3.) Ilika and Longnion (1977) offered reading classes for two groups of government employees; one group met for five and one half weeks and the other for eleven weeks. Otherwise the "total hours of instruction, instructor, content, tests, and behavioral objectives were the same" (p. 2). The researchers administered the Nelson-Denny Reading test and the McGraw-Hill Basic Skills System Reading test as pre- and post-test measures of achievement. The results indicated that the eleven-week group's scores on the Nelson-Denny Reading Test increased significantly more than the five-and-one-half week class's, but there were no significant differences in outcome on the McGraw-Hill test. Ilika and Longnion concluded that students in adult reading improvement courses learn significantly more under spaced versus massed instructional conditions.

In summary, with the exception of these two investigations, the research on intensive learning indicates equal if not superior short-term results for intensive courses regardless of the discipline or field of study under investigation--although the sciences and professions were less convincing. These results also coincide with Eckert's (1972) observation that the vast majority of courses can be effectively adapted to a time compressed format with proper modifications but that courses in foreign languages and the social sciences would be the most successful since these classes often incorporate considerable amounts of class discussion. Our analysis concurs. Although the mechanism for learning is unknown, certain fields of study may benefit from intensive courses more than others.

Long-Term Outcomes

One of the most important questions regarding intensive courses concerns their long-term impact on learning. The vast majority of the studies reviewed above measured achievement immediately following the end of the course and, with only two exceptions, found short-term outcomes to be equivalent or significantly better than in traditional courses. However, the long-term outcomes are equally if not more important--especially in light of the spacing effect research. Unfortunately, our literature review located only three studies that compared long-term outcomes between intensive and traditional formats.

Stewart's (1934) study investigated the differences between modular and concurrent scheduling in high school. Stewart compared 180 tenth-year high school students who were divided into two groups. The control group studied four courses concurrently over a twelve week semester (English, Latin, French, or Spanish, and geometry) with each class period equaling forty minutes. The experimental group took two courses every six-weeks and class periods were extended to 80 minutes. Otherwise, the courses, instructors, content, examinations, and course requirements were identical. Stewart administered standardized achievement tests immediately following the end of the courses to measure student learning. He found that the experimental group's performance exceeded the control group's in every subject tested. However, when tested six months later, the "concentrated" groups' scores declined significantly more than the "traditional" groups. According to Stewart:

> "One might infer from this that the learning of the concentration group 'faded out' more rapidly than that of the regular group. In this particular case, however, it should also be pointed out that

> the mean of the concentration group in November [immediately following the course] was higher than the mean of the regular group in May [six months following completion of the course]. In other words, even with what they had forgotten, the concentration group in November still knew as much as the regular group knew at the close of the experimental period in May" (p. 33).

In another study reported earlier, Doyle and his colleagues (1980) studied a business administration class that was offered both in an intensive and a traditional format. While they found that the intensive group earned slightly higher grades, their scores on the cognitive achievement test, which was administered immediately following the end of the course, were slightly lower. When they administered a post-test nine months later, they found no significant differences across the two groups in terms of their follow-up test scores, but noted that the results were slightly higher for the intensive group.

Finally, Waechter (1966) studied two groups of students enrolled in an Elements of Earth Science class that was offered under massed (9 week) and spaced (18 week) conditions. Each class had the same instructors and total amount of instructional time (66 hours). Waechter administered a pre-test and three post-tests; one immediately following the end of the course, the second after 3 months, and the last 4 and one-half months later. He found no statistical differences in the short-term (pre-test to post-test 1) or long-term (pre-test to post-test 3) gain scores between the two groups and concluded that massed and spaced learning conditions yielded equivalent results.

Although the spacing effect literature discussed earlier suggests that traditional formats may yield superior long-term outcomes over intensive learning conditions, the studies reviewed above suggest otherwise. It seems reasonable to conclude, if future research yields similar findings, that either intensive courses are not representative examples of massed practice or other mitigating factors negate the affects of massed practice on learning in intensive courses. Clearly more research is needed to provide a more definitive answer.

Course Requirements and Practices

One complaint often lodged against intensive courses concerns their academic standards. Many individuals in higher education suggest that intensive courses sacrifice academic standards in the process of adapting to time-compressed formats. For example, Blackburn's et al. (1977) study found that 44 percent of the faculty surveyed at the University of Wisconsin-Oshkosh felt that the 3- and 7-week modular courses negatively affected academic standards. Kirby-Smith's (1987) study noted similar concerns.

Our review did not find any studies which specifically addressed academic standards, but there are several studies which have compared course requirements and practices between the two formats. For example, Kirby-Smith's (1987) survey of faculty who taught intensive or traditional courses found that 50 percent of the respondents believed that alterations in the "mode of presentation" and course revisions were needed to successfully adapt a traditional-length course into a time-compressed format (p. 90). Only 45 percent of the respondents agreed that the two formats could use the same syllabus, readings, and evaluation procedures. Moreover, many of the faculty respondents indicated that projects had to be shortened and students were

often unable to submit a "finished product" (p. 91). According to Kirby-Smith, "many [faculty also] saw a need either to cut the amount of material covered or to cover the material in less depth" (p. 91).

Allen and his colleagues (1982) surveyed January interim faculty from 36 colleges nationwide and found that they were less likely to lecture, use a standard textbook, cover as much material, assign term papers, and grade through tests and quizzes than during the regular academic term. Faculty also indicated that they were more likely to utilize in-depth group discussions, individual and small group projects, experiential learning, and off-campus activities.

Similarly, Adelman and Reuben (1984) noted that the Colorado Block Plan, in contrast to traditional formats, utilized fewer labs and more computer simulations, more audio-visual presentations, journal articles more than textbooks, and more quizzes and short essay assignments as opposed to final examinations and term papers. Shapiro (1988) also reported differences in course requirements between the two types of formats. He found that his sample of weekend instructors required fewer examinations but more term papers and class participation than instructors in more traditional classes.

Finally, a whole host of case studies indicate that instructors adapt their instructional methods to intensive courses (Deveny and Bookout, 1976; Eller, 1983; Lasker et al., 1975; Parlett and King, 1971; Powell, 1976). Lasker et al. (1975) for example, examined intensive courses at Harvard's Graduate School of Education (HGSE) and compared them with more traditional classes. According to Lasker and his colleagues, HGSE's intensive courses were more process-oriented and encouraged experiential learning. In addition, intensive faculty adopted a more facilitative teaching role and varied class

experiences to maintain student interest. Overall, Lasker and his colleagues noted that intensive courses "provide a context for learning that can have enormously high focus and impact" (p. 8).

In summary, the results of these studies suggest that course requirements and practices often differ between intensive and traditional formats but the significance of these findings are unclear. Research is needed to determine if these differences affect academic standards and student achievement. It seems clear nonetheless, that faculty modify intensive courses in significant ways.

Student Attitudes Toward Intensive Courses

Many researchers have operated on the assumption that courses which heighten student enthusiasm, curiosity, motivation, and enjoyment are more likely to enhance student learning than those that do not. In turn, they have sought to measure students' attitudes regarding their educational experiences. A number of studies have investigated students' viewpoints with regard to intensive courses, and the majority have found that students generally endorse intensive learning--albeit with some reservations. The following section summarizes this research across the five major types of intensive formats: summer, interim, modular, regular term, and weekend. Several representative studies are discussed at length.

Summer

Scholars have surveyed (Patterson, Sedlacek, and Tracey, 1981) or examined (Deveny and Bookout, 1976; Eller, 1983; Keilstrup, 1981; Parlett and King, 1971) students attitudes towards intensive summer courses and generally, have found that students typically rate their experiences favorably. The following two studies are representative of the research on summer students'

attitudes.

Patterson and his colleagues (1981) surveyed 302 summer students at the University of Maryland-College Park campus and found that students viewed summer courses as much more intense than classes in the regular term and considered their summer courses "stimulating and exciting" (p. 32). The researchers also found significant differences in student satisfaction based on race and gender: non-white females and white males reported significantly greater course satisfaction than white females and non-white males.

Other researchers have measured student satisfaction regarding specific summer courses. Parlett and King (1971), for example, examined student evaluations of an experimental four-week summer physics class offered at MIT. At the end of the course, students were asked to rank the aspects of the class they appreciated most. The top three rankings included: a) "get to know an MIT professor well"; b) "have discussion with the instructor"; and c) "work on something continuously rather than having to break off to work on another subject" (p. 18).

In this same study, students were also asked to submit written comments. Parlett and King (1971) analyzed these comments and found that students "perceived the experience as more 'real,' more efficient, more intensive, more integrated, more challenging, and certainly as more enjoyable than their previous physics courses" (p. 27). At the same time, however, students noted that "had it not been for the diversity of activity, the varying schedule, and all the other 'extras' associated with [the course], overstimulation and strain would certainly have been experienced" (p. 19). Overall, the student evaluations overwhelmingly favored the intensive over the traditional format and the researchers concluded that intensive courses were "more conducive to

intellectual excitement, effective teaching, and active student participation, than . . . more conventional arrangement[s]" (p. 28).

Interim

All the literature examining students' attitudes towards interim courses--which included several surveys (Rossman, 1967, 1971; Centra and Sobol, 1974; Lightfield, 1972)) and case studies (DuVerlie, 1973; Masat, 1982)--reported positive student evaluations of intensive interim formats. Rossman (1967, 1971) was one of the first researchers to study students attitudes concerning interim sessions. He surveyed fifteen to twenty percent of the students at Macalester College for each of four successive years following the inauguration of an interim term. He found that over three-fourths of the students surveyed rated their enjoyment of the interim session higher than other academic terms regardless of their gender or prior academic record. Rossman summarized his findings as follows:

> "During each of the four years, at least three-fourths of the students sampled have seen the Interim Term as a successful educational venture and approximately two-thirds have found it to be a personally rewarding educational experience" (1967, p. 542).

Centra and Sobol (1974) found strong student support for Rider College's interim term, although they noted that students preferred courses in certain fields of study and programs more than others. Students rated the social science and science and math courses highest and general liberal arts and business classes lowest. Moreover, among the eight interim study programs offered at Rider College, students evaluated travel and off-campus programs as most effective and lecture and library project programs as the least effective.

DuVerlie (1973) and Masat (1982) also examined student responses to interim courses. DuVerlie described students' responses to an intensive interim course in French offered at the University of Maryland. According to DuVerlie, students enjoyed the relaxed learning atmosphere and 75 percent of the students indicated that they "felt more motivated to work and learn [in the interim class] than in their other courses . . ." (p. 17). Masat recorded several typical student responses to a computer science course offered during a 12-day interim session. One student remarked, for example, that "you always had you mind on the subject. Everything was always fresh and you were totally involved with the course" (p. 326). Another student wrote that "in this course you must keep up with the work. If you don't, you may not catch up" (p. 327). Based on the overall positive student response and outcomes, Masat enthusiastically endorsed the intensive format as an efficient and effective alternative to traditional-length courses.

Regular Term

We found three studies which examined student attitudes towards intensive courses offered during the regular semester or quarter (Frank, 1973; Kirby-Smith, 1987; Nahrgang, 1982). Kirby-Smith (1987) administered a 36-item questionnaire to students enrolled in 15 intensive and 12 matched semester-length courses and compared the groups' responses. She identified three questionnaire items that significantly differentiated the groups: students in the intensive group were more critical of the volume of work required, were more likely to report that there was insufficient time to complete assignments, yet were more likely to favor the inclusion of more intensive courses into the university's curriculum.

Kirby-Smith also asked students to identify the advantages and disadvantages of intensive courses. The advantages reported included "scheduling," "over quickly," "less travel time," "aids in child care," "able to take more courses," "less expense" and "learn more"--findings which suggest that "intensive" students prefer concentrated formats for their convenience than their educational merits (pp. 124-125). The disadvantages most often identified were fatigue, excessive workload, "too short a time to process information," "stress," "could not cover all the material," "too much work expected in too short a time," and "get burned out" (p. 126). Significantly, when asked which format they preferred, 86 percent of the intensive students favored the concentrated over the traditional format, whereas only 45 percent of the traditional group indicated the same preference. Moreover, 70 percent of the intensive group, as compared to 63 percent of the traditional group, felt that more intensive courses were needed in the curriculum. Yet, after analyzing the total student response, Kirby-Smith concluded that:

> "The negative attitudes expressed by faculty and students toward intensive courses being offered concurrently with 15-week courses are cause for alarm and signal a need for further research . . . . Considering the data available regarding problems encountered by faculty and students who are exposed to an intensive and traditional course calendar concurrently, it may be advisable for colleges and universities to limit enrollment in intensive courses to a select group of students who are enrolled in special programs in which all courses are being offered in the intensive mode" (pp. 130, 131).

Thus, despite the fact that intensive students favored additional intensive courses in the curriculum, Kirby-Smith's analysis of the general student response suggested that colleges and universities should scrutinize the practice of scheduling intensive and traditional-length courses concurrently.

Nahrgang (1982) described an intensive German course offered at North Texas State University. The course was the equivalent of four traditional-length German classes and allowed students to complete their foreign language requirement in one semester. According to Nahrgang, students were very satisfied with the intensive experience and rated the course favorably. In fact, on a scale of one ("very successful") to ten ("very unsuccessful"), student evaluations of the course averaged 2.08 (p. 30). Nahrgang attributed the positive student response to the strong collegial relationships formed in the class, the varied instructional methods, and the strong student/faculty commitment to the program.

Weekend

Several studies have surveyed students regarding their attitudes towards weekend courses (Doyle et al., 1980; Doyle and Yantis, 1977; Shapiro, 1988). Doyle and his colleagues, for example, compared student evaluations of a graduate business administration course offered in an intensive and traditional format. Students were asked to evaluate the difficulty of the course, the course objectives, their level of enjoyment, the degree of interest stimulated in the subject, the amount learned, the scope of the course, the required workload, the overall value of the course, and whether they would recommend the course to a friend. Doyle and his colleagues found no significant differences between the weekend and traditional students'

evaluations on these variables. Intensive students were also asked to evaluate whether concentrated formats "interfered with [their] ability to complete the course requirements" and whether they "placed undue hardships on [them] with respect to completing course requirements" (p. 11). According to Doyle and his colleagues, 40 percent of the intensive students agreed that concentrated formats interfered with assignment completion, but only 25 percent agreed that they caused "undue hardships" (p. 11).

In contrast to Doyle's et al. overall findings, Shapiro (1988) found significant differences between students' evaluations of intensive and traditional courses. Shapiro compared graduate student course evaluations submitted in 117 nine-week classes which met one night a week and 204 weekend classes which met over the course of two, three, or four weekends. He found that weekend students, when compared to the nine-week group, reported greater overall satisfaction with their courses, greater interest in the subject matter, and greater course difficulty. They were also more likely to indicate that they learned more, would recommend the course to a friend, and that the instructor's evaluation of the students was fair.

Finally, despite the fact that student response to intensive courses is generally favorable, Doyle and Yantis (1977) offered a summary of common student complaints. According to Doyle and Yantis, students often complain that "far too much work is compressed into too short a time period [and] that the instructor attempted to cover too much material in too short a period of time . . ." (p. B234). They concluded that students are generally enthusiastic about the learning experience but are also keenly conscious of the time constraints and additional pressure.

Modular

There has also been a number of studies concerning students attitudes toward modular courses (Blackburn et al., 1977; Heist and Taylor, 1979; Mazanec, 1972). Blackburn and his colleagues reported that two-thirds of the students who completed intensive courses under the University of Wisconsin-Oshkosh's new modular system indicated they were satisfied or very satisfied with the intensive courses. Students also remarked that the modular courses allowed "more time to concentrate on the subject," covered the material adequately, and were better suited for students holding part-time jobs (Wisconsin, 1978, p.10). Nevertheless, when a sample of the total student body was asked which time-format they preferred, 70 percent favored 14-week classes.

Colorado College also measured student attitudes after the college converted to a modular system. It surveyed two large samples of graduating seniors in 1977 and 1978 and found that over 90 percent of both samples described their overall experience under the modular plan as moderately to highly favorable and they recommended continuing the Colorado Plan unchanged or with minor modifications (Heist and Taylor, 1979).

Finally, Mazanec (1972) measured students' opinions of four classes (speech, English, political science, and algebra), offered in an intensive (3-week), semi-intensive (6-week), or traditional (15-week) format. When asked which format they preferred, students in the traditional classes demonstrated no significant preference for any particular format; students in the semi-intensive sections favored the semi-intensive time frame over all others; and students in the intensive classes preferred political science and speech in the 3-week format but were "equally divided" between the 3-week or 6-week

format for English and Mathematics (p. 143). This study indicates that students who experience intensive courses generally seem to prefer them over traditional formats but they favor greater or lesser degrees of intensity depending on the subject matter.

Factors Influencing Variations in Student Attitudes

As the last section illustrated, most studies have found students to be favorably inclined toward intensive learning regardless of type of intensive format. At the same time, however, the research shows that different groups of students exhibit more or less support for intensive courses depending on a number of factors. To begin, enrollment status has been found to be an influential element. Friedman's (1980) survey of students at a small liberal arts college found that full-time students preferred traditional-length courses which met two or three times per week. Noonan (1977) reported similar results, except his sample of students preferred 90 minute class meetings, twice a week.

Year in college and achievement level also has been found to influence student opinion. Rossman (1971) noted that upper division students and students with higher grade point averages rated Macalester College's Interim term higher vis-a-vis lower division students and students with lower grade point averages.

Student support for intensive study also seems to be influenced by discipline or field of study. Humphrey (in Shapiro, 1988) analyzed student evaluations from 53 master's-level classes in administration and found that course satisfaction was unrelated to its time-format--with one exception: students were more dissatisfied with intensive quantitative courses. Doyle and Yantis (1977) reported similar findings, but Shapiro (1988) found no such

association.

Centra and Sobol (1974) reported that students enrolled in social science and science and math courses evaluated their interim classes higher than students enrolled in other fields of study. Moreover, Mims (1983) surveyed 407 interim art students nationwide and found that they favored intensive schedules over concurrent course formats. According to Mims, students indicated that intensive classes allowed longer periods for concentrated work, stimulated student interest and motivation, and fostered faculty enthusiasm.

Finally, age appears to be another important factor influencing student attitudes. Kirby-Smith (1987) found that significantly more nontraditional students (aged 25 and over) favored additional intensive courses in the institution's curriculum compared to traditional-age students.

In summary, this section reviewed the research related to student attitudes towards intensive courses. Generally, students evaluate intensive courses favorably, particularly those that have experienced concentrated formats. Students especially seem to appreciate their convenience and efficiency, the opportunity they provide for concentrated and uninterrupted study, and the interest and motivation they inspire. Conversely, they dislike the time constraints, stress, and fatigue often associated with intensive courses, and research indicates that certain course formats--such as regular term intensive courses--may heighten stress and fatigue more than others.

Finally, the research suggests that certain student groups support intensive courses more than others. Preliminary research findings indicate that part-time and nontraditional students often prefer intensive courses over traditional formats, as do students in certain disciplines such as social

sciences and art.

Despite the fact that these studies consistently find substantial student support of intensive courses, additional research is needed to measure possible variations in student assessments based on student characteristics (e.g., age), course characteristics (e.g., quantitative), course format (e.g., regular term), or degrees of intensity (e.g., two weekend vs. eight weeks).

Studies of Faculty Attitudes Toward Intensive Courses

While surveys have consistently found that students support intensive courses, faculty attitudinal surveys reveal more mixed results. On the one hand, several studies indicate that faculty prefer to teach in traditional time-frames (Friedman, 1980; Kirby-Smith, 1987; Noonan, 1977). On the other hand, a larger number of studies have reported strong faculty endorsements of intensive courses (Allen et al., 1982; Berk, 1979; Centra and Sobol, 1974; Doyle and Yantis, 1977; Eller, 1983; Lasker et. al, 1975; Masat, 1982; Mazanec, 1972; Parlett and King, 1971; Shapiro, 1988; Solecki, 1971). The following discussion reviews the faculty-related research and categorizes the studies according to whether the investigation concerned summer, interim, modular, regular term, or weekend intensive courses. The more representative or illustrative studies are discussed at length.

Summer

Our review uncovered only one survey which measured faculty perceptions of summer school. Tracey, Sedlacek, and Patterson (1980) surveyed summer school faculty at a large state research university. Their findings revealed that summer faculty did not perceive many differences between summer and regular term classes. Faculty did, however, acknowledge several advantages and disadvantages to teaching in summer school. The advantages most often

identified included supplemental income, small classes, and greater student-faculty interaction; disadvantages included insufficient time to properly cover course material and for students to synthesize information, faculty fatigue, and inadequate faculty compensation. Overall, faculty disapproved of courses shorter than 4 1/2 weeks but were "neutral" about summer courses longer than 5 1/2 weeks (p. 3).

A number of case studies have reported faculty endorsements of intensive summer formats. Deveny and Bookout (1976) found that summer intensive courses evoke a high degree of "personal satisfaction for the teacher" (p. 63) and Eller (1983) reported that teachers' "efforts are rewarded [in intensive courses] because student progress is very rapid" (p. 226). Parlett and King (1971) observed that the "the instructor found [the intensive] method of instruction more rewarding, and a more efficient and natural way of communicating his knowledge of physics" (p. 28); and Solecki (1971) reported that "in the instructors' opinion, the [intensive] course was a great success" (p. 280). Thus, without exception, all the case studies reported positive faculty attitudes towards intensive formats.

Interim

Our review uncovered six surveys which measured faculty attitudes toward interim courses (Allen et al., 1982; Centra and Sobol, 1974; Harris, 1978; Lightfield, 1972; Richey et al., 1965; Rossman, 1967, 1971). Rossman's (1967) study of Macalester College's faculty attitudes towards their interim term found that of the 130 faculty surveyed, almost one-half reported that they enjoyed the interim session more than the regular term; less than 10 percent rated their interim experience less enjoyable. Moreover, over one-half of the faculty felt that the interim courses were no more difficult to teach than

those in the regular term. Rossman noted that students exhibited higher levels of interim satisfaction than faculty, but nonetheless concluded that faculty were generally very satisfied with Macalaster's interim term.

Centra and Sobol (1974) also found faculty less supportive of the interim term than students. Their survey of Rider College faculty found that 72 percent of the faculty evaluated the interim session favorably compared to 77 percent of the students. Moreover, 45 percent of the faculty indicated that interim term programs were "very respectable intellectually and academically," whereas 69 percent of the students agreed with this statement. Centra and Sobol noted that education and liberal arts faculty rated interim term programs highest and business school faculty rated them lowest.

In contrast to the previous two studies which measured faculty attitudes at specific institutions, Allen et al. (1982) conducted a nationwide survey of psychology interim instructors and found a "positive overall evaluation of the interim courses when compared to semester courses . . ." (p. 231). Allen and his colleagues inferred that faculty prefer interim courses since, according to their data, these classes more typically resemble seminars; allowed for more in-depth discussions, group projects, and experiential activities; and elicited more positive student response.

Finally, Richey et al. (1965) measured faculty attitudes regarding specific courses. They surveyed nine faculty who taught intensive courses during an intersession at Indiana University. Faculty were queried as to whether "course objectives," "course content," "teaching methodology," and "students' accomplishments" were the same, better, much better, worse, or much worse in intersession courses as compared to regular term classes. With the exception of course content, at least 75 percent of the faculty indicated that

these factors were the same, better, or much better in intersession courses than in regular term classes. However, 55 percent of the instructors reported that they were unable to cover the same amount of material in intersession courses as compared to semester classes.

Richey and his colleagues also summarized faculty comments concerning the advantages and disadvantages of intersession courses. According to Richey et al.:

> "[T]he key words lifted from the several favorable comments were 'concentration,' 'integration,' 'intensity,' and 'continuity'" . . . "The words or phrases which appeared most frequently in the list of disadvantages were 'less time,' 'no opportunities for extensive coverage,' 'decreased occasion for reflective comprehension,' and 'too rapid assimilation'" (pp. 34-35).

Regular Term

Our review uncovered only one survey measuring faculty attitudes toward regular term intensive courses (Kirby-Smith, 1987). Kirby-Smith surveyed and then interviewed 20 faculty, 14 of whom taught intensive courses and 6 who taught traditional-length classes. Kirby-Smith found that intensive course faculty consistently rated selected aspects of the experience higher than traditional faculty. For example, she found that 79 percent of the "intensive" faculty agreed or strongly agreed that course material could be presented adequately in compressed formats compared to 33 percent of the "traditional" faculty. Moreover, almost 86 percent of the "intensive" faculty agreed or strongly agreed that students could adequately grasp and comprehend course material in time-compressed formats versus 67 percent of the traditional group.

Kirby-Smith also asked faculty to identify the advantages and disadvantages of intensive formats. In terms of advantages, faculty indicated that intensive courses better accommodated the working student and provided enhanced opportunities to combine theory and practice. The major disadvantages identified by faculty included fatigue, lack of time, and excessive amount of preparation time. Moreover, when queried as to which format they preferred, only 45 percent of the faculty surveyed preferred to teach intensive courses; 40 percent favored traditional-length courses; and 15 percent indicated no preference. Interestingly, however, 75 percent of the faculty respondents advocated for more intensive courses in the university's curriculum. Overall, Kirby-Smith concluded that:

> "[F]rom an analysis of the faculty listing of advantages and disadvantages of intensive courses, the disadvantages are of a much greater magnitude and should lead college administrators to question whether intensive courses as currently formulated and administered, are appropriate delivery systems for higher education" (p. 122).

Kirby-Smith's findings suggests a seeming paradox: faculty tend to prefer to teach in traditional time frames, but they support intensive courses to accommodate students' schedules.

Modular

A number of institutions have surveyed faculty after inaugurating modular scheduling systems. Most of these studies have identified both faculty criticisms and praise regarding this form of intensive instruction. As to criticisms, Taylor and Ware (in Kirby-Smith, 1987) cataloged various faculty criticisms of the Colorado College Block Plan after its implementation. One faculty member, for example, reported that "the constant

pressure of reading, discussion, field trips, grading papers, [was] too intense to allow professional scientific work"; and another faculty member added that although students benefitted, intensive instruction was ". . . hard on the teacher" (in Kirby-Smith, p. 38). Blackburn and his colleagues (1977) also noted faculty discontent after the University of Wisconsin-Oshkosh adopted an intensive calendar format. They found that 39 percent of the faculty respondents reported an increase in their workload and 26 percent indicated greater time pressures. Of the faculty who responded to the question, 50 percent negatively evaluated the new intensive format. Blackburn et al. observed that most faculty

> "can see how someone else's material can be taught in shorter time-frames or by machines, but they are equally convinced that there is something inherent in the very nature of their own specialty that makes it impossible for it to be taught and learned in less than 14 (and many still insist, 17) weeks" (Wisconsin, 1978, p. 41).

Kuhns (1974) reached similar conclusions when she noted that many faculty teaching under modular systems believe that their subjects are incompatible with intensive formats.

However, many of these studies also noted positive faculty responses to intensive instruction. University of Wisconsin-Oshkosh's faculty for example, identified several advantages of the new scheduling format including "schedule or time flexibility for both students and faculty," "professional growth and revitalization," "increased student credit hour production," "increased options for students," and "curricular flexibility" (Blackburn et al., 1977, pp. 54-56, 58). In addition to the favorable faculty comments, Blackburn and

his colleagues--based on their field observations--also noted several positive effects of intensive scheduling. According to the researchers:

> "A fairly complacent and traditional faculty has been tripped into action. Spurred by administrative leaders, faculty are now rethinking curricular and pedagogical matters, and this is good--for all of the obvious reasons. . . . [T]o take the typical semester offering and package it for a three-week stint required major reflection and creation. What are the aims of this course, really? Who needs to do what to accomplish them? A whole host of basic philosophical and psychological questions had to be asked and answered. . . . [T]hese are important and good activities for faculty to be engaged in at regular intervals" (Blackburn et al., pp. 84-85).

Finally, Heist and Taylor (1979) noted that despite some faculty discontent, 80 to 94 percent of the Colorado College faculty supported Colorado College's Block Plan, regardless of their field of study. Their data revealed, for example, that 85 percent of the social science faculty, 88 percent of the natural science faculty, and 86 percent of the faculty in the humanities indicated moderate to high support of the Plan.

Weekend

Finally, our review found only one study which measured faculty's views of weekend courses. Shapiro (1988) compared intensive and traditional faculty responses on two different surveys. One survey required faculty to rate students on a variety of factors including the quality of students' written work, motivation level, and quantitative skills. The second survey queried instructors as to whether class format interfered with their class preparation, presentation, or students' ability to learn. The analysis

revealed only one item--relating to student motivation--which differentiated weekend and traditional faculty's responses to the surveys. According to Shapiro, weekend faculty rated student motivation in their classes higher than did faculty teaching traditional courses. Shapiro also noted that weekend faculty more often reported that intensive formats negatively affected student learning--though these findings were not statistically significant.

In summary, the research reviewed above concerning faculty perceptions of intensive instruction reveals mixed results. On the one hand, faculty do not perceive great differences in student performance or in their ability to meet course objectives between intensive and traditional-length courses. Moreover, faculty seem to appreciate the smaller classes, increased student-faculty interaction, the curricular flexibility, and comradeship often present in intensive courses. On the other hand, it appears that faculty would prefer to teach in traditional time frames but have reconciled themselves to intensive courses to accommodate students' schedules. Moreover, faculty consistently mention fatigue, inability to cover equivalent amounts of material as in traditional-length courses, the excessive preparation time, and concerns about student learning as major impediments to intensive courses.

Conclusions

We reach several conclusions based on our examination of the intensive course research. First and foremost, intensive courses have been found to yield equivalent--and sometimes superior--learning outcomes in comparison to traditional-length courses. This finding holds true across all major types of intensive course formats (summer, interim, modular, regular term, weekend). Thus, contrary to conventional wisdom, the literature strongly suggests that intensive formats produce learning outcomes at least equal to traditional

designs.

Second, the research results indicate that certain disciplines and fields of study may benefit from intensive formats more than others owing to the specific subject matter. As shown in our review, the social sciences and humanities had the highest proportion of disciplines with outcomes favoring intensive over traditional formats. However, the large number of studies across all fields and disciplines which have found no outcome differences between intensive and traditional formats suggest that all courses--regardless of field--can utilize intensive course designs without diminishing educational outcomes.

Third, the surveys and case studies indicate that students are generally supportive of intensive courses and especially appreciate their convenience and efficiency; which raises an important issue. Many in higher education have been reluctant to cater to students' utilitarian needs. But these studies suggest that students' needs can be accommodated without sacrificing educational outcomes. Still, convenience and efficiency may exact a price: student stress and fatigue have been found to be associated with intensive formats, though additional research is needed.

Fourth, we found that the most significant obstacle to intensive courses is faculty attitudes. Intensive courses are highly labor-intensive and can encumber faculty from fulfilling other responsibilities--most notably research. At the same time, however, most faculty seem to want to accommodate student schedules insofar as possible. Thus, faculty often confront two opposing forces: consumer demand for intensive courses and their own reluctance to commit to intensive experiences.

Fifth, this review examined time and its impact on learning. Consistent with Karweit's (1984) and Walberg's (1988b) reviews of the time and learning literature, a substantial portion of the intensive course research suggests that time is not the principal driving force with regard to learning. Indeed, the preponderance of studies, which have found no differences in outcomes between intensive and traditional courses across all formats and degrees of intensity, suggest that time--as it relates to intensity--may have relatively little influence on educational outcomes when it is considered in isolation. Students can learn effectively under a number of time-compressed circumstances.

Yet, the case studies and many of the quasi-experimental investigations suggest that time--in concert with other factors--may be consequential for student learning. The research suggests several possibilities. If learning is conceived as a process involving a series of inputs and throughputs which in turn influence various educationally-related outputs, there is evidence to suggest that learning experiences are different between many intensive and traditional-length classes. For example, both Blackburn et al. (1977) and Heist and Taylor (1979) found that faculty are forced to scrutinize their course goals and identify the most salient course content in the process of converting traditional classes to intensive formats. Faculty who teach intensive courses are also likely to modify their teaching methods by incorporating more discussion, experiential learning, and facilitation. Studies also suggest that "intensive" students concentrate more on their studies, participate more in class discussions, and are more highly motivated in intensive classes than in traditional-length courses. Intensive courses may heighten student and faculty involvement in the education process which,

in turn, could have a significant impact on learning.

Finally, consistent with Csikszentmihalyi's (1982) and Walberg's (1988a) research, the intensive course literature suggests that concentrated, in-depth experiences facilitate student development in ways not yet understood. The case studies, in particular, have consistently reported that students are often motivated, excited, and inspired by intensive course experiences, and that concentrated learning generates a level of satisfaction unlike that experienced in traditional-length classes. Various explanations have been offered for this heightened enthusiasm and satisfaction. Eckert (1972), for example, has argued that concentrated formats foster highly rewarding gestalt experiences which result from a "continued interrelationship among students" and a "coherent view of the subject" (p. 494). Csikszentmihalyi's research suggests that intensive courses may create "optimal experiences" which result from a "loss of self-consciousness" (p. 22). Regardless of the explanation, there seems to be considerable intrinsic satisfaction associated with concentrated learning which, in turn, may have untold affects on students' creativity and cognitive development. Clearly this is an important area for further research.

Critique of the Literature

While our discussion of the literature indicates that intensive courses can be effective alternatives to traditional formats, there are serious methodological and conceptual limitations to the research and for this reason, our findings are inconclusive. These limitations can be summarized as follows:

First, most of the experimental studies suffer from design limitations. To begin, only three of the studies reviewed incorporated random assignment, and very few studies attempted to match experimental and control groups or test for homogeneity between groups. Moreover, many of the samples were small and most of the investigations studied course formats in a single institution.

Second, in terms of outcome measures, many of the studies utilized final course grades as the only measure of achievement. There is justifiable concern throughout higher education as to whether course grades are a reliable and valid measure of learning. Since learning is such a complex and multifaceted phenomena, researchers need to use multiple achievement measures to assess learning outcomes (Powell, 1976). Closely related, most of these studies measured the acquisition of factual knowledge and failed to study the impact of intensive learning on "abstract, critical, complex, and reflective thinking" (Pascarella and Terenzini, 1991, p. 9). Moreover, value-related, attitudinal, and moral dimensions of learning were largely ignored.

Third, of those studies that used pre- and post-tests, many did so without testing for instrument reliability and validity. Moreover, most of the studies that utilized post-tests, administered them at the end of each course--which introduces another potential source of bias. Post-tests administered at the end of a semester-length class measures longer-term retention than a post-test given at the end of a 2 to 3 week intensive course. In turn, achievement outcomes are not necessarily comparable (Gleason, 1986).

Fourth, many of these studies were conducted under different conditions without controlling for extraneous effects. For example, one cannot easily compare the results of an interim course with a weekend class offered during the regular semester without taking the two environments into consideration.

Furthermore, the degree of course intensity differed between studies. A one-week intensive course differs considerably from an eight-week class. And, many studies failed to control other factors as well--including the total amount of classroom time, the instructor, the instructional method, and the course content and requirements. Future studies need to control for these potentially confounding variables.

In addition to methodological limitations, most of the research has not been anchored in a theoretical or conceptual framework. Out of the 35 studies reviewed, only six investigations tested the relevance of any theory or model to intensive learning (Boddy, 1985; Gleason, 1986; Ilika and Longnion, 1977; Kanun, 1963; Waechter, 1966) and only three specific models or theories were examined (massed versus spaced learning, interference theory, and an economic demand model of achievement). No other psychological, sociological, or economic models have been tested. Moreover, there were no inductive attempts to develop a theory of intensive learning.

Finally, the literature provided no interpretive analyses of intensive courses within a broader context of higher education. Intensive courses have significance far beyond the classroom, especially as they begin to challenge traditional notions of time and learning. For example, if one views time as one of many dimensions of curricula (Bergquist et al., 1981), and "curriculum as a temporal, information-processing structure in colleges and universities" (Conrad and Pratt, 1986, p. 249), then the existence and proliferation of intensive courses represent an significant information transformation within higher education--the nature of which is not yet understood. Accordingly, one must wonder what the existence and proliferation of intensive courses suggest about higher education as an evolving social and cultural system. What is the

nature of this information transformation, how does this transformation relate to changes in other areas of higher education, and what type of academic and organizational changes can we anticipate in the future (Conrad and Pratt, 1986)? These are important questions since any attempt to advance intensive courses in the curricula requires a concomitant organizational understanding.

In summary, the literature reviewed in this article contributes to our understanding of intensive learning but the shortcomings of the research also emphasize the need for well designed studies which rigorously compare intensive and traditional formats (Doyle, 1978), conceptual frameworks with which to explicate the findings, and interpretive analyses to understand their meaning and significance.

Future Directions for Research

A great deal of research remains to be done. As a guide to future research, we offer the following framework. To begin, we conceive of learning as process involving a series of inputs and throughputs which in turn influence educational outcomes. To assess the impact of intensive education, researchers clearly need to consider the nature, influence, and interaction of various input variables (e.g., student and faculty characteristics) as well as the environment in which students learn, and relate these to multiple output measures of student achievement. In this context, the following questions might help to guide future research.

Input (Students and Faculty)

1. How do students in intensive courses compare with students in traditional classes? Several researchers have suggested that intensive students differ significantly from the norm. Eckert (1972), for example, suggested that interim students are more motivated and goal-directed. Kirby-

Smith (1987) found that her sample of intensive students were older, more often employed full-time, had a higher grade-point-average, and had more children than students in semester-length classes. Kanun et al. (1961) also found intensive summer students to be older and to have earned higher grade-point-averages. To the extent these and other potential differences are common to intensive classes, then preexisting student characteristics may have a significant impact on the learning environment and student achievement.

2. How do faculty who teach intensive courses compare to those in traditional-length classes? Shapiro (1988) found that the faculty who taught intensive weekend courses were more often Ph.D.'s as opposed to Master's recipients and Blackburn et al.'s (1977) study found that intensive course faculty were younger. Future research needs to explore whether there are differences between faculty in intensive and traditional courses and, if so, what consequences--if any--do these have for the classroom environment and student learning.

3. How do students' perceptions and expectations of intensive classes influence course outcomes? For example, do students expect to work harder and consequently perform better? Several studies reported that students in intensive classes were more motivated but student expectations have never been measured.

The Learning Environment

1. How do course requirements and faculty expectations of students compare between intensive and traditional formats and, if different, how does this affect the learning environment and student learning outcomes? The current literature suggests that course requirements are often different between the two formats (Kirby-Smith, 1987; Allen et al., 1982; Adelman and

Reuben, 1984), but faculty expectations have yet to be studied.

2. How do student's study patterns compare between intensive and traditional-length courses? Gleason's (1986) study found that students enrolled in two intensive economics courses studied significantly less than students in matched semester-length classes, but they achieved the same or more. This study suggests that concentrated formats encourage more efficient methods of learning, but more research is clearly needed.

3. How do pedagogical approaches compare between intensive and traditional-length courses and, if different, how do these variations affect learning? For example, Allen's et al. (1982) survey of interim instructors found that they were less likely to lecture and more likely to utilize group discussions. If this is generally true of most intensive courses, this could prove significant. Research on college student achievement indicates that use of discussion over lecture promotes greater long-term retention, transfer of knowledge to new situations, problem solving, attitude change, and motivation for further learning (McKeachie, Pintrich, Lin, and Smith., 1987, p. 70). Pedagogical methods are surely an important consideration.

4. How do course environments compare between intensive and traditional-length courses? There are several studies suggesting that the classroom experience is significantly different between the two formats. For example, Deveny and Bookout (1976) noted increased student-faculty interaction in intensive courses; Lasker et al. (1975) and Nahrgang (1982) reported a stronger bond among students; and Allen et al. (1982) noted more enthusiasm in intensive classes. All these differences could significantly influence the classroom environment and, in turn, affect student learning outcomes.

5. How does the amount of "time-on-task" (i.e., productive class time) compare between intensive and traditional-length courses? Doyle and Yantis (1977) speculated that intensive courses may actually incorporate more time-on-task since there is less start-up and wind-down time involved. Moreover, Shapiro (1988) found that students in weekend courses reported more productive use of class time than students in more traditional classes. Since the time and learning literature indicates that time, particularly productive time, is a factor in learning, then time-on-task is an important consideration (Walberg, 1988b).

6. How do stress and fatigue affect learning in intensive courses? The National Institute of Health conducted several studies in which researchers subjected participants to 10-15 hours of foreign language instruction daily. They found that learning was significantly reduced under these conditions and cautioned against utilizing massed teaching techniques in foreign language instruction (Rocklyn and Montague in Hefferlin, 1972). These and other studies indicate that increasing levels of intensity will eventually produce diminishing returns, but the threshold has yet to be determined.

7. Are intensive courses intrinsically rewarding and if so, how does that affect the classroom experience and learning outcomes? Csikszentmihalyi's (1982) research suggests that intense, unfragmented concentration is "autotelic"--or intrinsically rewarding and with time could "become addictive" (p. 23). Several case studies also suggested that there is intrinsic satisfaction associated with concentrated study. If intensive learning inspires greater levels of motivation or intellectual pursuit, then it could be a potent pedagogical tool.

Learning Outcomes

1. How do the immediate (short-term) and long-term learning outcomes compare between intensive and traditional-length courses? This is perhaps the most important question to be answered. Although the short-term outcomes research suggests that intensive courses are effective alternatives to traditional formats, there is much less research on long-term effectiveness. If intensive formats represents a form of massed learning, as many have suggested, their long-term outcomes may be inferior to those in traditional courses.

2. How do different student groups compare in their ability to learn under intensive conditions? For example, do older and younger students learn equally well in intensive courses? Settlemeyer (1973) found no differences in her study of older (over-35) and younger (under-35) nursing students enrolled in an intensive nursing course, but additional research of this type is needed. Other student groups which should be compared include graduate and undergraduate students, high and low achieving students, upper and lower division students, and students with different learning styles.

3. How does the degree of intensity influence student achievement? Do three-week courses yield equivalent results as eight week courses? As reported earlier, preliminary findings have found little difference in outcomes between various levels of intensity but no study has carefully examined this issue.

4. How does the subject matter influence outcomes in intensive courses? The extant research findings are ambiguous. Most of the studies reviewed here found no difference in outcomes based on subject matter, but a few found that certain subjects taught in intensive formats yielded superior results to those

taught in traditional time-frames (e.g., Mazanec, 1972).

5. Which kinds and levels of learning are appropriate for intensive formats? Bloom (1956) theorized that there are six classes of learning: knowledge, comprehension, application, analysis, synthesis, and evaluation. According to Bloom, each successive level of learning requires increasingly complex and sophisticated thinking on the part of the student, along with greater amounts of time to successfully master. Since higher-order thinking is an important goal throughout postsecondary education, it is important to determine whether "intensive" students can analyze, evaluate, and synthesize course material equally well within the given time structure as students in traditional-length courses. Only one of the studies reviewed addressed this question. Waechter (1966) compared students' acquisition and understanding of science facts in an intensive and semester-length Elements of Earth Science class. He designed a sixty item, multiple choice test to measure factual knowledge and a twenty item, true-false test to measure understanding. Waechter found no statistical evidence to indicate a difference between the two groups' factual knowledge at the end of the course; however, the semester-length class exhibited significantly better understanding of the material. Hence, research may find that higher ordered thinking is best taught in traditional-length courses but additional research is clearly needed.

6. How do course withdrawals and degree completion rates compare between students who enroll in intensive versus traditional courses? For example, Mazanec (1972) found higher attrition rates for a 15-week mathematics class than either a corresponding 3- or 6-week intensive course. Moreover, Blackburn et al. (1977) noted that the University of Wisconsin-Oshkosh's 14-week classes had greater percentages of incompletes and withdrawals than

either the 3- or 7-week classes. Gaston (1974) noted similar results. With regards to graduation, Haney (1985) found no differences in degree completion rates between students who transferred to a senior institution from a modular-based junior college versus a matched group who transferred from a semester based two-year system. This type of research is important. If course withdrawals and degree completion rates differ between the two formats, this could help to inform educational practice in the future.

7. How do intensive courses influence a student's attitude toward learning? Eller (1983), Richardson (1973), Gaston (1974), and Nahrgang (1982) reported that intensive courses increased the number of students continuing into upper-division study in foreign languages. Eckert (1972) reported better class attendance and student motivation in intensive classes. Shapiro found that weekend students reported greater interest in the subject matter than students in more traditional-length courses. Conversely, Allen (1974), Ray and Kirkpatrick (1983), Studdard (1975), and Waechter (1966) all reported no differences in student attitudes toward the subject matter at the end of the course when comparing intensive and traditional-length students. Thus, the research findings are unclear and should be investigated more systematically.

Optimizing Factors and Conditions

In addition to examining the existing differences between intensive and traditional-length courses, research must discover the optimizing factors which--if incorporated--could ameliorate the learning environment and maximize student learning outcomes in intensive courses. Some questions important questions might include:

1. What types of courses are best suited for intensive formats? Although the literature reviewed suggests that a wide variety of courses can

be successfully re-organized into intensive formats, there is no research to indicate which courses would yield the best results.

2. What type of students are best suited for intensive formats? Several case studies have offered opinions. For example, Currall and Kirk (1986) suggested that students with higher grade-point-averages will benefit more from intensive instruction, whereas Lasker et al. (1975) asserted that students with an experiential style of learning respond best to intensive formats. However, our review found no experimental studies which have investigated this question.

3. What types of pedagogical styles and instructional practices are best suited for intensive formats? Must teaching strategies change for intensive courses to be effective? Breckon (1989) contends that intensive instructors should actively involve students, introduce greater variety into the class structure, utilize greater numbers of "prepared visuals," small group discussions, and in-class assignments, give shorter lectures, and emphasize essay over objective exams to be effective (p. 65). However, his assertions remain untested.

4. Can certain instructional practices optimize learning? Doyle and Yantis (1977) suggested the use of advance organizers as a pre-instructional strategy to optimize intensive learning. The concept of advanced organizers is based on the work of Ausubel, who argued that information can be learned more effectively if the instructor provides the student with a conceptual structure with which to anchor new information (Newell, 1984). Homework has also been suggested as an optimizing variable. For example, Weare (1973) investigated the use of nightly homework assignments in intensive courses as a method to optimize learning but found no differences in outcomes between

homework and no-homework groups. Other optimizing strategies might include use of class discussions, small group exercises and projects, or maintenance courses which Richardson (1973) argued was a requisite strategy for long term retention of material learned in intensive courses.

5. Do learning strategies differ between intensive and traditional-length courses and if so, can students effectively "learn how to learn" in time-compressed formats? In other words, can students be taught effective learning strategies for intensive courses that would enhance achievement outcomes?

Discussion

The review of the intensive course literature by Doyle and Yantis (1977) concluded that "it is clear from all the available evidence that intensive scheduling works at least as well as, and in some cases better than, traditional scheduling" (p. B-238). But they added that "the mechanisms responsible for the success of this approach have not yet clearly been identified" (p. B-238). Our review of the literature, which is based on more current literature, has led us to similar conclusions. Based on the evidence, intensive courses seem to be effective alternatives to traditional-length classes regardless of format, degree of intensity, discipline or field of study--although the research seems to suggest that certain fields of study may benefit more than others.

However, as discussed above, the same methodological and conceptual problems that tempered Doyle's and Yantis's conclusions temper ours as well. Moreover, our literature analysis also raises two larger issues which universities--as well as researchers--need to address: the relationship between academic time and learning and an epistemological question concerning

intensity and depth vis-a-vis extensiveness and breadth.

Colleges and universities are under heavy pressure to implement outcomes-based assessments. In so doing, postsecondary institutions need to not only investigate the efficacy of intensive courses and other new forms of instructional practices, but they should re-evaluate academic time altogether. As Adelman and Reuben (1984) note, the traditional "credit system substitutes time for performance as a measure of learning" (p. 92). Consequently, "there is no guarantee . . . that every student has mastered the course material--let alone allied material that may be the stuff of true learning" (p. 92). Conrad (1978) emphasizes that the current system allows no opportunity to match the pace of the instruction to the material presented or the educational goals of the course. Gettinger (1984) argues that the time needed to master subject material has rarely been considered in education. Thus, under the traditional system the relationship between time and learning remains arbitrarily defined and the needs of faculty, students, as well as the subject matter remain subservient to this definition. If learning is truly the essential outcome to education, then time should not remain intractable, inflexible, and uncompromising. Instead, academic time should accommodate--not ignore--educational needs, and colleges and universities should consider a wide variety of course formats which vary according to length, pace, and intensity to temporally match course formats with the educational goals of each course and the needs of all students.

Finally, an important epistemological question also emerges from our discussion of intensive course research: the relative merits of breadth and extensiveness versus depth and intensity in the pursuit of knowledge. Many colleges and universities adhere to a eclectic tradition where breadth and

extensiveness are emphasized over depth and intensiveness. This eclecticism could have a wide range of repercussions for students. For example, some have suggested that this eclectic approach fragments epistemology and prevents students from developing a unified outlook (Glazer, 1987). From a cognitive perspective, eclecticism may impede the development of certain cognitive skills that concentrated, in-depth learning nourishes. The intensive course research suggests that breadth and depth experiences may cultivate different educational perspectives and cognitive skills, and curriculum should incorporate both epistemological assumptions. At this juncture, there seems to be no "right" method to dissiminate knowledge and colleges and universities--as well as researchers--need to investigate many curricular variations. As Toombs (1977-1978) wisely noted, it is not the "formal order" which hinders attempts to improve curriculum, but the tendency to "conceive of a curriculum from a limited frame of reference" (p. 20).

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APPENDIX A. Intensive Course Studies by Type of Format

STUDY	COURSE DURATIONS COMPARED	OUTCOME*			
		NS	+I	+T	CS
SUMMER					
Austin et al, 1988	1-week; 2 1/2-wknd*; 5-wknd; and 5-week classes	X			
Bester, 1965	6-week and 16-week classes	X			
Boddy, 1985	5-, 8-, and 16-week classes	X	X		
Deveny and Bookout, 1976	8-week class				X
Eller, 1983	8-week class				X
Gaston, 1974	12-week and 2-quarter classes		X		
Gleason, 1986	3-, 5-, and 15-week classes	X	X		
Kanun et al., 1963	5- and 10-week classes	X			
Kanun et al., 1963	2 1/2-, 5-, and 10-week classes	X			
Keilstrup, 1981	6-week class				X
Masat, 1982	3-week, 6-week, and semester-length classes	X			
Murphy, 1979	2-week class	X			
Parlett and King, 1971	4-week and semester-length classes				X
Solecki, 1971	6-week class				X
Stephens, 1978	12-week class				X
Troiani, 1986	10-day class				X
INTERIM					
DuVerlie, 1973	Interim class				X
Masat, 1982	3-week, 6-week, and semester-length classes	X			
Richey et al. 1965	13-day and 17-week classes	X	X	X	
Studdard, 1975	3- and 15-week classes	X			
Tyler, 1970	4-week class				X
Wallace, 1972	3-week class				X
MODULAR					
Blackburn et al., 1977	3-, 7-, and 14-week classes	X			
Haney, 1985	modular and semester classes	X			
Kuhns, 1974	modular and semester classes		X		
Mazanec, 1972	3-, 6-, and 15-week classes	X	X		
Richardson, 1973	8-week class				X
Waechter, 1966	9- and 18-week classes	X			

APPENDIX A. (Continued)					
REGULAR TERM					
Allen, 1974	5- and 15-week classes	X			
Brackenbury, 1978	7-, 8-, 15-week, and 4-wknd classes	X			
Doyle and Sanders (cited in Doyle, 1978)	3-week, 6-week, and semester-length classes	X			
Frank, 1973	one semester class				X
Kirby-Smith, 1987	"intensive" and 15-week classes	X			
Knowles, 1972	7-day and 15-week classes	X			
Ray and Kirkpatrick, 1983	3- and 15-week classes		X		
WEEKEND					
Austin et al., 1988	1-week, 5-week, 2 1/2-wknd, and 5-wknd classes	X			
Berk, 1979	8-day class				X
Brackenbury, 1978	7-, 8-, 14-week, and 4-wknd classes	X			
Doyle, 1978	2-wknd and 4-week classes	X			
Doyle et al., 1980	2-wknd and 16-week classes	X			
Doyle and Yantis, 1977	4-wknd and 9-week classes	X			
Lasker et al., 1975	unspecified				X
Pflanzer and East, 1984	unspecified				X
Shapiro, 1988	2-, 3-, and 9-week and 4-wknd classes	X			

*wknd = weekend
NS = nonsignificant differences in outcome
+I = findings in favor of intensive formats
+T = findings in favor of traditional formats
CS = case study - all case studies favored intensive formats

TABLE 1. Summary of Mazanec's Findings

	Pre- and Post-Test Scores	Final Grades
Algebra	no differences in outcomes	no differences in outcomes
Speech	no differences in outcomes	6-week class exceeded 15-week class
English	6- and 15-week classes exceeded 3-week class	3-week class exceeded 15-week class
Political Science	3-week class exceeded 6- and 15-week classes	3- and 6-week classes exceeded 15-week class

TABLE 2. Outcome Studies by Field of Study and Discipline

Field of Study/ Discipline	Experimental Studies			Case Studies*
	Nonsignificant	Significant + Intensive*	Significant + Traditional*	
HUMANITIES				
English	Allen, 1974 Richey et al., 1965	Mazanec, 1972		
Foreign Languages (general)				Tyler, 1970 Wallace, 1972
French		Gaston, 1974		DuVerlie, 1973 Stephens, 1978
German				Frank, 1973 Richardson, 1973 Keilstrup, 1981
Russian				Solecki, 1971
Spanish				Deveny and Bookout, 1976 Eller, 1983 Troiani, 1986
History	Boddy, 1985			
Philosophy	Brackenbury, 1978			
Speech		Mazanec, 1972		
MATHEMATICS AND SCIENCE				
Mathematics				
Algebra	Mazanec, 1972			
Calculus	Kanun et al., 1963			
Computer Science	Masat, 1982	Boddy, 1985		
Diff. Equations	Kanun et al., 1963			
Statistics				Berk, 1979
Science				
Biology				Pflanzer and East, 1984

TABLE 2 (Continued)				
Earth Science	Waechter, 1966			
Geography	Doyle and Sanders (in Doyle, 1978) Richey et al., 1965			
Health	Kanun et al., 1963			
Physics				Parlett and King, 1971
Physical Science	Studdard, 1975			
SOCIAL SCIENCES				
Economics	Gleason, 1986 Murphy, 1979	Gleason, 1986		
Human Development				Lasker et al., 1975
Human Sexuality		Ray and Kirkpatrick, 1983		
Political Science		Mazanec, 1972		
Psychology	Kanun et al., 1963 Doyle and Yantis, 1977 Richey et al., 1965	Richey et al., 1965		
Sociology	Kanun et al., 1963	Richey et al., 1965		
PROFESSIONS				
Architecture				Parlett and King, 1971
Business Admin.	Doyle et al., 1980			
Education	Richey et al., 1965 Boddy, 1985		Richey et al., 1965	
Home Economics		Richey et al., 1965		
Library Science	Richey et al., 1965			
Pharmacy	Bester, 1965			
Research Methods	Austin et al., 1988 Knowles, 1972			

* +intensive - outcomes favor intensive course
+traditional - outcomes favor traditional course
All case studies reported positive outcomes in favor of intensive courses

TABLE 3. Number of Studies Reporting Significant or Nonsignificant Outcomes According to Major Field of Study

	Significant	Nonsignificant	Total
Humanities	3	5	8
Social Sciences	5	6	11
Math and Sciences	1	9	10
Professions	2	8	10

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